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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/879,688	Applicant(s) KIM ET AL.
	Examiner Joseph D. Torres	Art Unit 2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,14-20,25 and 29-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,14-20,25 and 29-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I in Paper No. 12 is acknowledged. The traversal is on the ground(s) that Groups I, II and V are directed to the same invention. The Examiner agrees.

Claims 1-9, 14-20, 25 and 29-31 remain in the case and will be examined together.

Specification

2. The disclosure is objected to because of the following informalities: Line 15 on page 23 recites '920-907'. '907' is not a correlation calculator.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-7 and 14-18 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 and 14 recite, "extended Reed-Muller code". The Applicant provides

at least two different definitions of an extended Reed-Muller code. On page 4, the Applicant defines an extended Reed-Muller code as a (32, 10) Reed-Muller code. For the purposes of this rejection the Examiner assumes that an extended Reed-Muller code is a (32, 10) Reed-Muller code.

Claims 2-7 and 15-18 depend from respective claims 1 and 14, hence inherit the deficiencies in respective claims 1 and 14.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 14, 15 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Citation #4 ("Text proposal regarding TFCI coding for FDD", TSGR1#7(99)D69, August 30-September 3, 1999).

35 U.S.C. 102(b) rejection of claim 1.

Citation #4 teaches apparatus for encoding k=10 consecutive input bits indicating a TFCI (Transport Format Combination Indicator) of into a sequence of m=30 symbols in an NB-TDD (Narrowband-Time Division Duplex) mobile communication system (Figure 1 of Section 4.3.1 in Citation #4), comprising: an encoder for encoding the k=10 input bits into a sequence of at least $2^n=2^5$ symbols where $2^n=2^5>m=30$, using an extended

Reed-Muller code (Note: Citation #4 teaches that TFCI codewords can be generated from either a [32, 10] second order Reed-Muller code or two [16, 15] Reed-Muller codes); and a puncturer for performing puncturing on the sequence of 2^5 symbols from the encoder so as to output a sequence of m=30 symbols (the Puncturer in Figure 1 of Section 4.3.1 in Citation #4 punctures sequence of 2^5 Reed-Muller encoded symbols from the encoder so as to output a sequence of m=30 symbols).

35 U.S.C. 102(b) rejection of claim 14.

Citation #4 teaches method for encoding k=10 consecutive input bits indicating a TFCI (Transport Format Combination Indicator) of into a sequence of m=30 symbols in an NB-TDD (Narrowband-Time Division Duplex) mobile communication system (Figure 1 of Section 4.3.1 in Citation #4), comprising: encoding the k=10 input bits into a sequence of at least $2^n=2^5$ symbols where $2^n=2^5>m=30$, using an extended Reed-Muller code (Note: Citation #4 teaches that TFCI codewords can be generated from either a [32, 10] second order Reed-Muller code or two [16, 15] Reed-Muller codes); and puncturing on the sequence of 2^5 symbols from the encoder so as to output a sequence of m=30 symbols (the Puncturer in Figure 1 of Section 4.3.1 in Citation #4 punctures sequence of 2^5 Reed-Muller encoded symbols from the encoder so as to output a sequence of m=30 symbols).

35 U.S.C. 102(b) rejection of claim 15.

Citation #4 teaches generating 1-bit a sequence of same symbols (an All 1's bit Sequence is generated for use in the bi-orthogonal code generator of Figure 2 of Section 4.3.1 in Citation #4); generating a plurality of basis orthogonal sequences (the Orthogonal Variable Spreading Factor Codes used as input to the bi-orthogonal code generator of Figure 2 of Section 4.3.1 in Citation #4 are a plurality of basis orthogonal sequences); generating a plurality of basis mask sequences (Figure 2 of Section 4.3.1 in Citation #4 teaches that a plurality of basis mask sequences are produced for input to the bi-orthogonal code generator of Figure 2); and an operator for receiving the TFCI including a first information part indicating conversion to a biorthogonal sequence (Figure 2 of Section 4.3.1 in Citation #4 teaches an operator for receiving the TFCI including a first information part a_0 indicating conversion to a biorthogonal sequence), a second information part indicating conversion to an orthogonal sequence (Figure 2 of Section 4.3.1 in Citation #4 teaches an operator for receiving the TFCI including a second information part $a_1 \ldots a_5$ indicating conversion to an orthogonal sequence) and a third information part indicating conversion to a mask sequence (Figure 2 of Section 4.3.1 in Citation #4 teaches an operator for receiving the TFCI including a third information part $a_6 \ldots a_9$ indicating conversion to a mask sequence), and generating the sequence of $2^n=2^5$ symbols by combining an orthogonal sequence selected from the basis orthogonal sequences by the second information part (Multipliers in Figure 2 of Section 4.3.1 in Citation #4 are used to combine an orthogonal sequence selected from the basis Orthogonal Variable Spreading Factor code sequences by the second information part $a_6 \ldots a_9$), a biorthogonal sequence constructed by a combination of the

selected orthogonal sequence and the same symbols selected by the first information part, and a mask sequence selected by the third information part (the Summer in Figure 2 of Section 4.3.1 in Citation #4 are used to construct the biorthogonal sequence code output by a combination of the selected orthogonal sequence selected by the second information part $a_1 \ldots a_5$ and the same symbols selected by the first information part a_0, and a mask sequence selected by the third information part $a_6 \ldots a_9$).

35 U.S.C. 102(b) rejection of claim 19.

Citation #4 teaches a method for encoding k=10 consecutive input bits indicating a TFCI of each of successively transmitted frames into a sequence of m=30 symbols in an NB-TDD mobile communication system (Figure 1 of Section 4.3.1 in Citation #4), comprising: creating a plurality of biorthogonal sequences having a length of at least $2^n=2^5$ where $2^n=2^5>m=30$ (Figure 2 of Section 4.3.1 in Citation #4 is a means for creating plurality of biorthogonal sequences having a length of at least $2^n=2^5$ where $2^n=2^5 >m=30$ whereby a k=10 bit input is used to select the biorthogonal sequence; Note: a biorthogonal code is a biorthogonal sequence), and outputting a biorthogonal sequence selected from the biorthogonal sequences by first information bits of the TFCI (Figure 2 of Section 4.3.1 in Citation #4 teaches that first information bits $a_0 \ldots a_5$ are used to select the biorthogonal sequence to be outputted as a biorthogonal code); creating a plurality of mask sequences (Figure 2 and Table 1 of Section 4.3.1 in Citation #4 teaches that mask sequences are created for operating the biorthogonal code generator of Figure 2), and outputting a mask sequence selected from the mask

sequences by second information bits of the TFCI (information bits $a_6 \ldots a_9$ are use to select from the mask sequences inputted in Mask lines 1-4); adding the selected biorthogonal sequence and the mask sequence (the summer in Figure 2 of Section 4.3.1 in Citation #4 is a means for adding the selected biorthogonal sequence and the mask sequence); and performing puncturing on the sequence of $2^n=2^5$ symbols so as to output the sequence of m=30 symbols (the Puncturer in Figure 1 of Section 4.3.1 in Citation #4 punctures sequence of 2^5 Reed-Muller encoded symbols from the encoder so as to output a sequence of m=30 symbols).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 2, 5-9, 17, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Citation #4 ("Text proposal regarding TFCI coding for FDD", TSGR1#7(99)D69, August 30-September 3, 1999).

35 U.S.C. 103(a) rejection of claim 2.

Citation #4 teaches generating 1-bit a sequence of same symbols (an All 1's bit Sequence is generated for use in the bi-orthogonal code generator of Figure 2 of Section 4.3.1 in Citation #4); generating a plurality of basis orthogonal sequences (the Orthogonal Variable Spreading Factor Codes used as input to the bi-orthogonal code generator of Figure 2 of Section 4.3.1 in Citation #4 are a plurality of basis orthogonal sequences); generating a plurality of basis mask sequences (Figure 2 of Section 4.3.1 in Citation #4 teaches that a plurality of basis mask sequences are produced for input to the bi-orthogonal code generator of Figure 2); and an operator for receiving the TFCI including a first information part indicating conversion to a biorthogonal sequence (Figure 2 of Section 4.3.1 in Citation #4 teaches an operator for receiving the TFCI including a first information part a_0 indicating conversion to a biorthogonal sequence), a second information part indicating conversion to an orthogonal sequence (Figure 2 of Section 4.3.1 in Citation #4 teaches an operator for receiving the TFCI including a second information part $a_1 \ldots a_5$ indicating conversion to an orthogonal sequence) and a third information part indicating conversion to a mask sequence (Figure 2 of Section 4.3.1 in Citation #4 teaches an operator for receiving the TFCI including a third information part $a_6 \ldots a_9$ indicating conversion to a mask sequence), and generating the

sequence of $2^n=2^5$ symbols by combining an orthogonal sequence selected from the basis orthogonal sequences by the second information part (Multipliers in Figure 2 of Section 4.3.1 in Citation #4 are used to combine an orthogonal sequence selected from the basis Orthogonal Variable Spreading Factor code sequences by the second information part $a_6 \ldots a_9$), a biorthogonal sequence constructed by a combination of the selected orthogonal sequence and the same symbols selected by the first information part, and a mask sequence selected by the third information part (the Summer in Figure 2 of Section 4.3.1 in Citation #4 are used to construct the biorthogonal sequence code output by a combination of the selected orthogonal sequence selected by the second information part $a_1 \ldots a_5$ and the same symbols selected by the first information part a_0, and a mask sequence selected by the third information part $a_6 \ldots a_9$).

However Citation #4 does not explicitly teach the specific use of a 1-bit generator, a basis mask sequence generator and a basis orthogonal sequence generator.

The Examiner asserts that as pointed out above the bi-orthogonal code generator of Figure 2 of Section 4.3.1 in Citation #4 requires an All 1's bit Sequence, basis mask sequences and basis orthogonal sequences for proper operation, hence clearly suggests that a 1-bit generator, a basis mask sequence generator and a basis orthogonal sequence generator are required to operate the bi-orthogonal code generator.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Citation #4 by including use of a 1-bit generator, a basis mask sequence generator and a basis orthogonal sequence

generator. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a 1-bit generator, a basis mask sequence generator and a basis orthogonal sequence generator would have provided the opportunity to implement the design in Citation #4 since a 1-bit generator, a basis mask sequence generator and a basis orthogonal sequence generator are required to operate the bi-orthogonal code generator.

35 U.S.C. 103(a) rejection of claims 5 and 17.

Citation #4 substantially teaches the claimed invention described in claims 1, 2, 14 and 15 (as rejected above).

However Citation #4 does not explicitly teach the specific use of a specific mask sequence.

The Examiner asserts that one of ordinary skill in the art at the time the invention was made would have know (64, 10) code would dramatically increase error correction capabilities and would have been motivated to increase error correction by using a (64,10) code. In addition, Modifying the Encoder in Figure 2 of Citation #4 to alter the number of OVSF code sequences is an obvious variation of the encoder in Figure 2 of Citation #4 since such and encoder is still comprised of a Mask Input, an All 1's input, OVSF input and 3 Information block inputs, each Information block input corresponding to the Mask Input, an All 1's input and OVSF input. A (64,10) code would have required 64-bit masks. Hence altering the encoder of Figure 2 in Citation #4 to accept 64-bit

OVSF inputs, 64-bit Mask Inputs and 64-bit All 1's input is an obvious variation of the Encoder in Figure 2 of Citation #4 that one of ordinary skill in the art at the time the invention was made would have been motivated to implement to increase error correction capabilities. In addition, using a specific mask is also an obvious variation of the encoder of Figure 2 in Citation #4.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Citation #4 by including use of a specific mask sequence. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a specific mask sequence would have provided the opportunity to increase error correction capabilities.

35 U.S.C. 103(a) rejection of claim 6.

See rejection to claim 2 and Figure 2 of Citation #4.

35 U.S.C. 103(a) rejection of claims 7 and 18.

Citation #4 substantially teaches the claimed invention described in claims 1, 2, 5, 6, 14, 15 and 17 (as rejected above).

However Citation #4 does not explicitly teach the specific use of particular puncturing patterns.

The Examiner asserts that one of ordinary skill in the art at the time the invention was made would have known that a (64, 10) code would dramatically increase error

correction capabilities and would have been motivated to increase error correction by using a (64,10) code. Puncturing the (64, 10) code to produce a (48, 10) code is also an obvious variation of the puncturer taught in Figure 1 of Citation #4, hence use of specific puncturing patterns is an obvious embodiment of the encoder and puncturing devices taught in Figures 1 and 2 in Citation #4 that one of ordinary skill in the art at the time the invention was made would have been motivated to implement to increase error correction capabilities.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Citation #4 by including use of particular puncturing patterns. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of particular puncturing patterns would have provided the opportunity to increase error correction capabilities.

35 U.S.C. 103(a) rejection of claim 8.

Citation #4 teaches a method for encoding k=10 consecutive input bits indicating a TFCI of each of successively transmitted frames into a sequence of m=30 symbols in an NB-TDD mobile communication system (Figure 1 of Section 4.3.1 in Citation #4), comprising: creating a plurality of biorthogonal sequences having a length of at least $2^n=2^5$ where $2^n=2^5>m=30$ (Figure 2 of Section 4.3.1 in Citation #4 is a means for creating plurality of biorthogonal sequences having a length of at least $2^n=2^5$ where $2^n=2^5>m=30$ whereby a k=10 bit input is used to select the biorthogonal sequence;

Note: a biorthogonal code is a biorthogonal sequence), and outputting a biorthogonal sequence selected from the biorthogonal sequences by first information bits of the TFCI (Figure 2 of Section 4.3.1 in Citation #4 teaches that first information bits $a_0 \ldots a_5$ are used to select the biorthogonal sequence to be outputted as a biorthogonal code); creating a plurality of mask sequences (Figure 2 and Table 1 of Section 4.3.1 in Citation #4 teaches that mask sequences are created for operating the biorthogonal code generator of Figure 2), and outputting a mask sequence selected from the mask sequences by second information bits of the TFCI (information bits $a_6 \ldots a_9$ are use to select from the mask sequences inputted in Mask lines 1-4); adding the selected biorthogonal sequence and the mask sequence (the summer in Figure 2 of Section 4.3.1 in Citation #4 is a means for adding the selected biorthogonal sequence and the mask sequence); and performing puncturing on the sequence of $2^n=2^5$ symbols so as to output the sequence of m=30 symbols (the Puncturer in Figure 1 of Section 4.3.1 in Citation #4 punctures sequence of 2^5 Reed-Muller encoded symbols from the encoder so as to output a sequence of m=30 symbols).

However Citation #4 does not explicitly teach the specific use of a orthogonal sequence generator and a mask sequence generator.

The Examiner asserts that as pointed out above the bi-orthogonal code generator of Figure 2 of Section 4.3.1 in Citation #4 requires an All 1's bit Sequence, basis mask sequences and basis orthogonal sequences for proper operation, hence clearly suggests that a 1-bit generator, a basis mask sequence generator and a basis

orthogonal sequence generator are required to operate the bi-orthogonal code generator.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Citation #4 by including use of a 1-bit generator, a basis mask sequence generator and a basis orthogonal sequence generator. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a 1-bit generator, a basis mask sequence generator and a basis orthogonal sequence generator would have provided the opportunity to implement the design in Citation #4 since a 1-bit generator, a basis mask sequence generator and a basis orthogonal sequence generator are required to operate the bi-orthogonal code generator.

35 U.S.C. 103(a) rejection of claims 9 and 20.

Citation #4 substantially teaches the claimed invention described in claims 8 and 19 (as rejected above).

However Citation #4 does not explicitly teach the specific use of particular puncturing patterns.

The Examiner asserts that one of ordinary skill in the art at the time the invention was made would have known that a (64, 10) code would dramatically increase error correction capabilities and would have been motivated to increase error correction by using a (64,10) code. Puncturing the (64, 10) code to produce a (48, 10) code is also

an obvious variation of the puncturer taught in Figure 1 of Citation #4, hence use of specific puncturing patterns is an obvious embodiment of the encoder and puncturing devices taught in Figures 1 and 2 in Citation #4 that one of ordinary skill in the art at the time the invention was made would have been motivated to implement to increase error correction capabilities.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Citation #4 by including use of particular puncturing patterns. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of particular puncturing patterns would have provided the opportunity to increase error correction capabilities.

6. Claims 3, 4, 16, 25 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Citation #4 ("Text proposal regarding TFCI coding for FDD", TSGR1#7(99)D69, Auguest 30-September 3, 1999) in view of Citation #7 ("Harmonization impact on TFCI and New Optimal Coding for extended TFCI with Almost no Complexity increase", TSGR#6(99)970, July 13-16, 1999).

35 U.S.C. 103(a) rejection of claim 3.

Citation #4 substantially teaches the claimed invention described in claims 1 and 2 (as rejected above).

However Citation #4 does not explicitly teach the specific use of a (64,10) code.

Citation #7, in an analogous art, teaches that a (32, 10) code can be created from two composite (16, 5) coders (see Figure 2 on page 2 of Citation #7). Citation #4 teaches a single (32, 10) code. The Examiner asserts that one of ordinary skill in the art at the time the invention was made would have know (64, 10) code would dramatically increase error correction capabilities and would have been motivated to combine Citation #4 with Citation #7 by using two composite (32, 10) coders in Figure 2 on page 2 of Citation #7 to create a (64,10) code in order to enhance error correction capabilities.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Citation #4 with the teachings of Citation #7 by including use of a (64,10) code. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a (64,10) code would have provided the opportunity to enhance error correction capabilities.

35 U.S.C. 103(a) rejection of claims 4 and 16.

Citation #4 substantially teaches the claimed invention described in claims 1, 2, 14 and 15 (as rejected above).

However Citation #4 does not explicitly teach the specific use of a specific Walsh code.

Citation #7, in an analogous art, teaches the specific use of a Walsh code in Figure 5 on page 5 of Citation #7 which is the same encoder as the encoder in Figure 2 of Section 4.3.1 in Citation #4, hence is an alternative embodiment of the encoder in Figure 2 of

Section 4.3.1 in Citation #4 since a Walsh code is an Orthogonal Variable Spreading Factor (OVSF) Code. In addition, Modifying the Encoder in Figure 2 of Citation #4 to alter the number of OVSF code sequences is an obvious variation of the encoder in Figure 2 of Citation #4 since such and encoder is still comprised of a Mask Input, an All 1's input, OVSF input and 3 Information block inputs, each Information block input corresponding to the Mask Input, an All 1's input and OVSF input.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Citation #4 with the teachings of Citation #7 by including use of a specific Walsh code. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a specific Walsh code would have provided the opportunity to implement an alternative embodiment of the Encoder in Figure 2 of Citation #4.

35 U.S.C. 103(a) rejection of claim 25.

Citation #4 teaches apparatus for encoding k=10 consecutive input bits indicating a TFCI (Transport Format Combination Indicator) of into a sequence of m=30 symbols in an NB-TDD (Narrowband-Time Division Duplex) mobile communication system (Figure 1 of Section 4.3.1 in Citation #4), comprising: an encoder for encoding the k=10 input bits into a sequence of at least $2^n=2^5$ symbols where $2^n=2^5>m=30$, using an extended Reed-Muller code (Note: Citation #4 teaches that TFCI codewords can be generated from either a [32, 10] second order Reed-Muller code or two [16, 15] Reed-Muller

codes); and a puncturer for performing puncturing on the sequence of 2^5 symbols from the encoder so as to output a sequence of m=30 symbols (the Puncturer in Figure 1 of Section 4.3.1 in Citation #4 punctures sequence of 2^5 Reed-Muller encoded symbols from the encoder so as to output a sequence of m=30 symbols).

However Citation #4 does not explicitly teach the specific use of a (64, 10) Reed Muller code using Walsh codes.

Citation #7, in an analogous art, teaches the specific use of a Walsh code in Figure 5 on page 5 of Citation #7 which is the same encoder as the encoder in Figure 2 of Section 4.3.1 in Citation #4, hence is an alternative embodiment of the encoder in Figure 2 of Section 4.3.1 in Citation #4 since a Walsh code is an Orthogonal Variable Spreading Factor (OVSF) Code. In addition, Modifying the Encoder in Figure 2 of Citation #4 to alter the number of OVSF code sequences is an obvious variation of the encoder in Figure 2 of Citation #4 since such and encoder is still comprised of a Mask Input, an All 1's input, OVSF input and 3 Information block inputs, each Information block input corresponding to the Mask Input, an All 1's input and OVSF input. In addition, The Examiner asserts that one of ordinary skill in the art at the time the invention was made would have known that a (64, 10) code would dramatically increase error correction capabilities and would have been motivated to increase error correction by using a (64,10) code. Puncturing the (64, 10) code to produce a (48, 10) code is also an obvious variation of the puncturer taught in Figure 1 of Citation #4, hence use of specific puncturing patterns is an obvious embodiment of the encoder and puncturing devices taught in Figures 1 and 2 in Citation #4 that one of ordinary skill in the art at the time the

invention was made would have been motivated to implement to increase error correction capabilities.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Citation #4 with the teachings of Citation #7 by including use of a specific Walsh code. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a specific Walsh code would have provided the opportunity to implement an alternative embodiment of the Encoder in Figure 2 of Citation #4 and to increase error correction capabilities.

35 U.S.C. 103(a) rejection of claims 29 and 30.

Citation #4 teaches method for encoding k=10 consecutive input bits indicating a TFCI (Transport Format Combination Indicator) of into a sequence of m=30 symbols in an NB-TDD (Narrowband-Time Division Duplex) mobile communication system (Figure 1 of Section 4.3.1 in Citation #4), comprising: encoding the k=10 input bits into a sequence of at least $2^n=2^5$ symbols where $2^n=2^5>m=30$, using an extended Reed-Muller code (Note: Citation #4 teaches that TFCI codewords can be generated from either a [32, 10] second order Reed-Muller code or two [16, 15] Reed-Muller codes); and puncturing on the sequence of 2^5 symbols from the encoder so as to output a sequence of m=30 symbols (the Puncturer in Figure 1 of Section 4.3.1 in Citation #4 punctures sequence of 2^5 Reed-Muller encoded symbols from the encoder so as to output a sequence of m=30 symbols).

However Citation #4 does not explicitly teach the specific use of a (64, 10) Reed Muller code using Walsh codes.

Citation #7, in an analogous art, teaches the specific use of a Walsh code in Figure 5 on page 5 of Citation #7 which is the same encoder as the encoder in Figure 2 of Section 4.3.1 in Citation #4, hence is an alternative embodiment of the encoder in Figure 2 of Section 4.3.1 in Citation #4 since a Walsh code is an Orthogonal Variable Spreading Factor (OVSF) Code. In addition, Modifying the Encoder in Figure 2 of Citation #4 to alter the number of OVSF code sequences is an obvious variation of the encoder in Figure 2 of Citation #4 since such and encoder is still comprised of a Mask Input, an All 1's input, OVSF input and 3 Information block inputs, each Information block input corresponding to the Mask Input, an All 1's input and OVSF input. In addition, The Examiner asserts that one of ordinary skill in the art at the time the invention was made would have known that a (64, 10) code would dramatically increase error correction capabilities and would have been motivated to increase error correction by using a (64,10) code. Puncturing the (64, 10) code to produce a (48, 10) code is also an obvious variation of the puncturer taught in Figure 1 of Citation #4, hence use of specific puncturing patterns is an obvious embodiment of the encoder and puncturing devices taught in Figures 1 and 2 in Citation #4 that one of ordinary skill in the art at the time the invention was made would have been motivated to implement to increase error correction capabilities.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Citation #4 with the teachings of Citation #7 by including

use of a specific Walsh code. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a specific Walsh code would have provided the opportunity to implement an alternative embodiment of the Encoder in Figure 2 of Citation #4 and to increase error correction capabilities.

35 U.S.C. 103(a) rejection of claim 31.

Citation #4 substantially teaches the claimed invention described in claims 29 and 30 (as rejected above).

However Citation #4 does not explicitly teach the specific use of a specific mask sequence.

The Examiner asserts that one of ordinary skill in the art at the time the invention was made would have know (64, 10) code would dramatically increase error correction capabilities and would have been motivated to increase error correction by using a (64,10) code. In addition, Modifying the Encoder in Figure 2 of Citation #4 to alter the number of OVSF code sequences is an obvious variation of the encoder in Figure 2 of Citation #4 since such and encoder is still comprised of a Mask Input, an All 1's input, OVSF input and 3 Information block inputs, each Information block input corresponding to the Mask Input, an All 1's input and OVSF input. A (64,10) code would have required 64-bit masks. Hence altering the encoder of Figure 2 in Citation #4 to accept 64-bit OVSF inputs, 64-bit Mask Inputs and 64-bit All 1's input is an obvious variation of the Encoder in Figure 2 of Citation #4 that one of ordinary skill in the art at the time the

invention was made would have been motivated to implement to increase error correction capabilities. In addition, using a specific mask is also an obvious variation of the encoder of Figure 2 in Citation #4.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Citation #4 by including use of a specific mask sequence. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a specific mask sequence would have provided the opportunity to increase error correction capabilities.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Solomon; Gustave (US 3818442 A) teaches generalized Reed-Muller codes. Hong; Sung Kwon et al. (US 6341125 B1) teaches a method for transmitting a transport format combination indicator (TFCI) inserted to each time slot of a radio frame in a mobile telecommunication system using a W-CDMA standard.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (703) 308-7066. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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